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ORIGINAL ARTICLE

Effectiveness of the teach-back method for improving the health literacy of senior citizens in nursing homes

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Abstract

Aim: To explore the effectiveness of the teach-back method for improving the health literacy of older adults in nursing homes in Ürümqi, the capital of Xinjiang, China.

Methods: Among the 27 registered nursing homes, 10 were selected randomly by size and divided into the intervention and control groups. A total of 127 older adults in the intervention group and 136 in the control group met the inclusion criteria. The intervention and control groups were educated by using the teach-back and traditional methods, respectively, in this 6 month study. The Chinese Citizen Health Literacy Questionnaire was used to evaluate the effects of the interventions.

Results: Pre-intervention, the health literacy level of the cohorts was relatively low. Postintervention, the total health literacy score of the intervention group increased, while the total health literacy score of the control group had increased to a lesser extent. The total and four-dimension scores of the two groups were statistically significant. The intergroup difference in the two groups, and the intervention group's total health literacy score and each dimension score were higher than in the control group; these differences were statistically significant .

Conclusions: The teach-back method can improve the health literacy level of older adults through short-term educational intervention. The teach-back method should be adopted by more healthcare providers and applied to improve the health literacy education of older adults.

Key words: health literacy, intervention, nursing homes, teach-back.

INTRODUCTION

In 2015, there were 22.2 million older adults (aged ≥60 years) in China, accounting for 16.1% of the total population. Among them, 14.3 million were ~65 years old, accounting for 10.5% of the total population. Older adults are a vulnerable group, often with chronic diseases, and the goal is to allow older adults to take control of their health. A lack of health knowledge decreases older adults' ability to manage their health; thus, medical organizations and healthcare providers must consider quality improvement measures to assist older adults in self-management.

In 2005, health literacy was regarded as building the capacity to complete the required actions and was proposed as a strategy for health promotion at The Bangkok Charter for Health Promotion in a Globalized World (World Health Organization, 2005).

Health literacy is the ability to obtain, understand, and use healthcare information or services to make appropriate health decisions and judgments in order to maintain or promote one's health (Mark, 2009). Studies have shown that health literacy has a direct impact on various health-related aspects of life, including knowledge, lifestyle, behaviors, and the use of medical and health services (Liu, Chu, & Meng, 2013). Individuals with a low level of health literacy often show an

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inadequate knowledge level of disease prevention, have lower ability to self-manage conditions, and are less likely to adopt preventive health measures. Hence, they might delay the best time for disease control, increase the incidence of complications, and even significantly increase the need for medical services (such as hospitalization), emergency treatment, and medication costs (Morrow *et al.*, 2006). In 2013, National Health and Family Planning Commission of the People's Republic of China officially published the health literacy survey results. Only 5.76% of older adults (65–69 years) had adequate health literacy; this age group showed the lowest levels (National Health and Family Planning Commission of the People's Republic of China, 2014). It is very urgent to improve the health literacy of older adults in China in order to maintain their health status.

In studies on health literacy interventions, researchers improved patients' health literacy by using various methods of health education (Jiang, Wu, & Geng, 2014). However, during the health education programs, the recipients paid little attention to memorizing and understanding health knowledge. A study revealed that 40%–80% of the doctor-provided information was directly forgotten and ~50% of the information was misunderstood (Anderson, Dodman, & Kopelman, 1979), factors that were related largely to the recipients' health literacy level (Liu, Liang, & Yao, 2014).

Before this research, the authors have tried to provide a variety of methods to deliver health literacy education to older adults, such as class presentations, health fairs, and so on. In both of these studies, the health literacy of older adults were measured before and after the educational intervention. But, the results from both studies showed that the test scores after the interventions increased only insignificantly. Therefore, strategies to improve the health literacy of older adults are still needed.

One strategy to assess the health literacy of older adults following education is through a process known as "teach-back." Some studies have shown that the teach-back method can increase patients' understanding of how to manage their health (Kalise, 2014). The key aim is to assess the effectiveness of the provider's ability to deliver knowledge to the recipients.

The teach-back method (White, Garbez, Carroll, Brinker, & Howie-Esquivel, 2013), also called the "show-me" or "closing-the-loop" approach, is an interactive learning process between the healthcare providers and the recipients. The providers use this method to assess the recipients' understanding by asking the recipients to articulate or demonstrate what was taught in the recipients' own words. The recipients' answers allow the providers to continue educating or to re-educate misunderstood information. The teach-back method is a tool that is used by healthcare providers to guide recipients' communication practices and validate recipients' understanding of the information that is delivered. The use of the teach-back method is a recipient-centered initiative used to improve recipients' understanding of how to manage their health and to place the burden of misunderstanding on the provider, not the recipients. The teach-back method has been used widely abroad (Wilson, Mayeta-Peart, Parada-Webster, & Nordstrom, 2012), but it has not been reported in a Chinese population.

The primary purpose of this study was to: (i) carry out a baseline survey of the health literacy of institutionalized older adults in Ürümqi, the capital of Xinjiang in China; and (ii) evaluate the effectiveness of the teach-back method as an educational strategy for improving older adults' health literacy.

METHODS

Study's participants

Between March and April, 2014, 27 nursing homes that were registered in Ürümqi were divided by using the stratified cluster random sampling method into three layers according to size; that is, large (≥100 residents), medium (60–100 residents), and small (<60 residents). Among these nursing homes, 10 (two large, four medium, and four small) were randomly extracted by using a random number table and the nursing homes in each layer were randomly assigned to the intervention or to the control groups (n = 5 each). The study's participants in each nursing home were selected according to the inclusion criteria and a baseline survey was conducted.

The inclusion criteria were as follows: age: ≥60 years, clear consciousness, normal cognitive function, ability to read or speak, no communication barrier with the investigator, and a willingness to cooperate after receiving an explanation of the study. The exclusion criteria were as follows: an unwillingness to cooperate and the presence of mental or cognitive disorders or severe or terminal diseases.

A total of 127 patients in the intervention group and 136 in the control group met the inclusion criteria and the health literacy intervention was conducted in the nursing homes between May and October, 2014. During the study, one participant in the intervention group

was lost to follow-up, while two participants of those in the control group withdrew from the study. Therefore, a total of 126 participants was in the intervention group, while 134 participants were in the control group. Prior written informed consent was obtained from every patient and the study was approved by the Ethics Review Board at the authors' institution.

Measures

Health Literacy Questionnaire

The 2008 Chinese Citizens Health Literacy Questionnaire (Li *et al.*, 2010), issued by the Chinese Health Education Center, was used and completed by three nursing graduate students through a one-on-one interview with each participant. The questionnaire consisted of two parts: (i) general information about the participants, including their name, sex, age, educational level, previous occupations etc.; and (ii) the health literacy of the participants, including their knowledge, beliefs, behaviors, and skills (the questionnaire was based on the Knowledge–Attitude–Practice Model and added the dimension of skill).

Health knowledge, which is related to health and can improve individual or group health literacy, was queried with questions, such as "What do you think should be involved in a healthy lifestyle?" The health beliefs model suggests that persons' beliefs about health problems, the perceived benefits of actions and barriers to actions, and self-efficacy explain engagement (or the lack of engagement) in health-promoting behaviors. This category included questions, such as "Please state your opinion about reducing or quitting smoking and alcohol." Health behaviors are important risk factors for major chronic disease; thus, patients were asked: "Please describe how one may prevent some infectious and chronic diseases." Health skills can improve self-care agency, ensure the implementation of health behavior, and promote individual health. The researchers asked the participants questions, such as "Please demonstrate how to measure body temperature and pulse rate."

These four dimensions contained a total of 98 items and the score of each item was two points, making a maximum of 196 points. The total questionnaire showed a Cronbach's α coefficient of 0.904 and the four dimensions (health knowledge, health beliefs, health behaviors, and health skills) were 0.871, 0.774, 0.802, and 0.704, respectively, indicating high reliability, while the factor analysis showed a good construct validity. Thus, the Chinese Citizen Health Literacy Questionnaire satisfactorily reflects the health literacy level of older adults.

Teach-back method assessment indices

The teach-back assessment index was designed according to the "66 Indicators for Chinese Citizens' Health Literacy" that was issued by the National Health and Family Planning Commission of the People's Republic of China and teach-back assessment indices that are used abroad (White *et al.*, 2013). Each health literacy dimension contained two questions and four dimensions, for a total of eight questions: (i) What do you think should be included in health status?; (ii) What do you think should be involved in a healthy lifestyle?; (iii) Please state your opinion about reducing or quitting smoking and alcohol; (iv) If you were sick, what would you normally do?; (v) Please describe how one may prevent some infectious and chronic diseases; (vi) How would you manage expired food or medicine?; (vii) Please demonstrate how to measure body temperature and pulse rate; and (viii) When you were in need of emergency medical assistance, which two phone numbers should have been called?

After the health education was delivered, feedback was solicited through interviews with the recipients. The education process was considered complete after all of the educated recipients could answer all of the questions correctly.

Intervention

Graduate students

Three graduate students comprised the health education team and received unified training in order to ensure that they fully understood the intervention materials and were familiar with the form-filling methods, precautions, and survey script. Pre-intervention, the participants' health literacy levels were assessed by using the Chinese Citizens Health Literacy Questionnaire. Then, health education was conducted in each institution. The intervention group was educated by using the teach-back method, while the control group was educated using the traditional method.

Intervention group

Each participant was issued with a "66 Indicators for Chinese Citizens' Health Literacy" brochure and the educators explained the related health literacy knowledge within it. Given their degradation of physiological function, the older adults only studied 22 health literacy indicators each month, each time lasting 40 min,

Table 1 Comparison of the social and demographic characteristics of the two groups

Social and demographic characteristics	Intervention group		Control group		χ^2-value	*P*-value
	N	Proportion (%)	N	Proportion (%)		
Sex					1.559	0.212
Male	69	55	63	47		
Female	57	45	71	53		
Age (years)					5.882	0.118
<65	5	4	13	10		
~65	24	19	19	14		
~75	67	53	61	45		
≥85	30	24	41	31		
Ethnic group					0.403	0.612
Han	124	98	133	99		
Minority	2	2	1	1		
Education					3.789	0.285
Primary and below	60	48	75	56		
Junior school	35	28	27	20		
High school/college	19	15	15	11		
Undergraduate and above	12	9	17	13		
Monthly family income (RMB)					6.896	0.141
<500	22	17	18	13		
~500	10	8	10	8		
~1000	22	17	15	11		
~2000	16	13	32	24		
≥5000	56	45	59	44		
Number of family members					0.436	0.804
~1	40	32	39	29		
~3	78	62	88	66		
≥6	8	6	7	5		
Marriage					1.146	0.357
Unmarried	3	2	1	1		
Other	123	98	133	99		
Previous occupation					2.735	0.741
Manager of enterprises	31	25	26	19		
General clerk	17	13	17	13		
Technical worker	39	31	42	31		
Service worker	11	9	17	13		
Manufacturing worker	5	4	9	7		
Agricultural worker	23	18	23	17		

finishing the brochure in 3 months. Thus, they could complete two rounds of study in 6 months. The educators explained the health literacy indicators clearly by using plain language and they avoided medical jargon and vague terms. After each health education session was completed, the educators summarized the study content and obtained feedback from all the group members by asking teach-back questions. Then, the teach-back assessment indices were used to confirm how much the participants had mastered the health literacy knowledge. The participants were asked to explain the covered material from each of the four dimensions of health literacy in their own words. If the answers were wrong or incomplete, the educators explained the issue again until all of the participants answered each question correctly.

Control group

Each participant was issued with a "66 Indicators for Chinese Citizens' Health Literacy" and the health education program consisted of the same content, presented by the same educators. After the group study, the health education process was considered to be complete. The

education schedule arrangement was consistent between intervention groups.

In addition, to stimulate interest and improve the educational effect, the researchers applied two methods to the intervention and control groups. First, a prize-winning knowledge contest was conducted each month. Second, posters of health literacy knowledge were displayed and exchanged every month. The two methods were taken in order to reinforce the education and improve the participants' knowledge of health literacy, develop their health skills, and promote their health beliefs and behaviors.

Two 3 month study periods were included, for a total of 6 months, from May to October, 2014. Postintervention, the health educators conducted another survey by using the same 66 Indicators for Chinese Citizens Health Literacy questionnaire to compare the effect between the intervention and the control groups.

Quality control

The graduate students (health educators) received unified training and had a full understanding of the intervention materials, questionnaire content, form completion method, and survey script. The health management and education program was carried out in each nursing home by the same three graduate students in order to ensure uniform educational content and assessment standards. During the survey, the questionnaires were reviewed and the omissions were filled in a timely manner.

Statistical analysis

The data were checked randomly after entry and the database was locked after data verification. A descriptive analysis was conducted by using IBM SPSS Statistics for Windows v. 17.0 software (IBM Corporation, Armonk, NY, USA). Counting the data was compared by the χ^2-test, while the measurement data were compared by using the *t*-test. Statistical significance was defined at $P < 0.05$.

RESULTS

Participants' social and demographic characteristics

The 126 participants in the intervention group had an average age of 79.18 ± 8.81 years, while the 134 participants in the control group had an average age of 79.07 ± 9.23 years. The two groups showed no significant difference in their sex, age, previous occupation, or educational background ($P > 0.05$), indicating good comparability of the baseline data (Table 1).

Baseline health literacy level of the older adults in nursing homes

The baseline survey of the participants' health literacy level in the four dimensions showed that the total health literacy score was 48.58 ± 16.26, while those for health knowledge, beliefs, behaviors, and skills were 24.04 ± 11.31, 17.74 ± 4.69, 5.30 ± 1.47, and 2.49 ± 1.17, respectively, all of which were very low (Table 2).

Comparing the intervention and control groups' health literacy scores at baseline and postintervention

Before the intervention, the baseline level of the two groups showed no significant difference in total health literacy or in different dimension scores ($P > 0.05$), indicating good comparability of the baseline data; however, after the intervention, the health literacy score of the intervention group increased to 110.10 ± 17.68, while the health literacy score of the control group increased to 74.96 ± 27.16. The total health literacy score, as well as the four dimensions in the intervention

Table 2 Baseline health literacy data by dimension ($n = 260$)

Health literacy and dimensions	Minimum	Maximum	Mean ± SD	95% CI	Normal range
Health literacy	2	112	48.58 ± 16.26	46.60–50.57	0–196
Health knowledge	2	60	24.04 ± 11.31	22.66–25.42	0–106
Health belief	0	34	17.74 ± 4.69	17.17–18.31	0–40
Health behavior	0	10	5.30 ± 1.47	5.12–5.48	0–24
Health skill	0	16	2.49 ± 1.17	2.11–2.88	0–26

CI, confidence interval; SD, standard deviation.

Table 3 Comparison of the intervention and control groups' health literacy scores at baseline and postintervention

Dimension	Before the intervention		*t*-value	*P*-value	After the intervention		*t*-value	*P*-value
	Intervention	Control			Intervention	Control		
Health knowledge	23.05 ± 12.46	24.97 ± 10.07	–1.372	0.171	59.86 ± 17.95	37.46 ± 15.23	10.821	0.001
Health belief	17.19 ± 5.27	18.25 ± 4.03	–1.821	0.070	25.72 ± 3.34	22.45 ± 9.98	3.590	0.001
Health behavior	5.19 ± 1.83	5.40 ± 1.01	–1.150	0.252	15.09 ± 0.54	8.64 ± 3.33	22.088	0.001
Health skill	2.14 ± 3.50	2.82 ± 2.80	–1.731	0.085	9.43 ± 1.91	6.42 ± 2.70	10.443	0.001
Health literacy	47.57 ± 19.57	49.54 ± 12.38	–0.961	0.338	110.10 ± 17.68	74.96 ± 27.16	12.431	0.001

group, were significantly higher ($P < 0.05$) than in the control group (Table 3).

Comparing the differences in the intervention and control groups' health literacy scores pre- and postintervention

An independent two-sample *t*-test was used to compare the differences pre-and postintervention in the two groups. The differences in total health literacy, as well as in the four dimensions in the intervention group, were significantly higher ($P < 0.05$) than in the control group (Table 4).

DISCUSSION

To date, studies of senior citizens' health literacy mostly have focused on participants who are 60–69 years old. Few studies have involved older participants and none have reported the health literacy of the institutionalized elderly (Liu *et al.*, 2013). Compared with the results of Zhao and Sun (2011) (average age: 54.27 ± 6.80 years; total health literacy score: 108.37 ± 28.85), the senior citizens in Ürümqi showed a lower initial level of health literacy (average age: 79.18 ± 8.81 years; total health literacy score: 48.58 ± 16.26); thus, more attention should be paid to the health literacy education of this population. But, how effective are the current strategies that educators use to teach older adults about health literacy and what can be done to improve health information recall?

After 6 months of collective health literacy education and intervention, the older adults from the nursing homes in Ürümqi all showed significantly increased health literacy scores, as well as improved scores across the four dimensions. This finding indicates the urgent need for improved health literacy education among older adults in nursing homes and suggests that different intervention methods might encourage the active participation of older adults and achieve good results.

Experts have proposed the teach-back method as a useful strategy for improving the understanding and recall of health information by patients with low health literacy (Sudore & Schillinger, 2009), which is consistent with the current results. In this study, older adults' health literacy levels were lower before the intervention, but after the intervention, the participants who had been educated with the teach-back method showed significantly higher health literacy scores, as well as in each dimension, compared with the controls ($P < 0.05$). This could be because the learning ability of older adults decreases with age and that new knowledge can be difficult to understand or is easily forgotten due to inherently low health literacy levels. The teach-back method required repeated instructions and/or recall of key concepts by using the recipients' own words: during such feedback, knowledge that was not understood or was misunderstood could be identified by the educator and explained again until the recipients had correctly mastered all the knowledge. The understanding and memorizing of health knowledge would be enhanced through these continuous feedback processes, such that the

Table 4 Comparison of the differences in the intervention and control groups' health literacy scores pre- and postintervention

Dimension	Intervention group (Difference)	Control group (Difference)	*t*-value	*P*-value
Health knowledge	36.81 ± 21.72	12.49 ± 17.52	9.903*	0.001
Health belief	8.53 ± 5.89	4.19 ± 10.87	4.034*	0.001
Health behavior	9.90 ± 2.05	3.24 ± 43.28	19.851*	0.001
Health skill	7.29 ± 3.94	3.60 ± 4.01	7.479	0.001
Health literacy	62.52 ± 26.34	25.43 ± 29.31	10.711	0.001

* represents the *t*-value.

participants who had been educated by the Teach-back method had a higher health literacy score, compared with the controls.

Negarandeh, Mahmoodi, Noktehdan, Heshmat, & Shakibazadeh (2013) conducted a study in order to apply teach-back methods and focused on low-health literacy participants. This study strengthened the evidence that teach-back strategies benefit low-health literacy participants.

The teach-back method is an effective health education approach because it specifically targets low-health literacy individuals. A number of other interventional studies on low health literacy using participants with varying degrees of literacy have found that, while everyone improved their knowledge, those with low health literacy had more improvements from the baseline than those with higher health literacy (Kim, Love, Quistberg, & Shea, 2004).

Through the feedback process, the older adults were completely involved in the health education activities and understand all the content, which increased their initiative and enthusiasm. Thus, the teach-back method can change the passive mode of knowledge acceptance of other methods and instill correct health literacy concepts to recipients, thereby truly exerting its effect on disease prevention.

In addition, relative to the intervention group, the health literacy level in the control group also improved in the postintervention period. To some extent, the traditional and one-directional presentations could help older adults to understand and to memorize the knowledge, to promote the health literacy scores, but without feedback and assessment of the educational quality, the effectiveness was not as good as that for the intervention group.

This study had a number of potential limitations. First, self-reported health literacy is susceptible to patient recall bias. In addition, the study had measurement bias: only the single-blind method was selected. Second, this study might not be representative of all older adults because it was conducted only in nursing homes. Third, the small sample size was a study limitation. Fourth, after intervention using traditional or teach-back methods, the recall and retention of information of the older adults did not compare over time in this study. These limitations might influence the interpretation of the results. The small sample size in both the control and the intervention groups limited the researchers' ability to fully analyze the recall and retention of information by the older adults with regards to age and cognitive function. Further studies that examine the health literacy education of elderly, community-dwelling residents should explore the linkages between health education, learning effects, and health outcomes, thereby expanding the education level of the population and increasing the practical significance of the studies.

CONCLUSION

The teach-back method is an effective health education approach to improve the health literacy levels of senior citizens through educational intervention. The teach-back method should be adopted by more health education providers and applied to improving the health literacy education of elderly adults.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Y-B. L. carried out the study, participated in collecting the data, and drafted the manuscript; L. L. conducted the statistical analysis and collected the data; Y-F. L. and Y-L. C. participated in the Teach-back method intervention. All the authors read and approved the final manuscript.

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